

## APPENDIX A

### REFERENCES

#### SECTION I. REQUIRED PUBLICATIONS

FAR 30.101	Cost Accounting Standards, Part 30, <u>Federal Acquisition Regulation</u> , Government Printing Office, Washington, D.C., 1999.
FAR 31.105	Construction and Architect-Engineer Contracts, <u>Federal Acquisition Regulation</u> , Government Printing Office, Washington, D.C., 1999.
FAR 31.205-10	Cost of Money, <u>Federal Acquisition Regulation</u> , Government Printing Office, Washington, D.C., 1999.
FAR 31.205-24	Maintenance and Repair Costs, <u>Federal Acquisition Regulation</u> , Government Printing Office, Washington, DC., 1999.
EFARS 31.105	Construction and Architect-Engineer Contracts, <u>Engineer Federal Acquisition Regulation Supplement</u> , Government Printing Office, Washington, D.C., 1999.
EFARS 31.105-100	Contract Statement, <u>Engineer Federal Acquisition Regulation Supplement</u> , Government Printing Office, Washington, D.C., 1999.
	<u>Producer Prices and Price Indexes</u> , U. S. Department of Labor, Bureau of Labor Statistics, Government Printing Office, Washington, D.C., 1957 thorough 1999.

#### SECTION II: RELATED PUBLICATIONS

Application Manual for Hydraulic Excavators and Shovels, 1st ed, Koehring Company, Milwaukee, Wisconsin, 1981.

Bulletin B-300, Goodyear Tire and Rubber Company, Akron, Ohio, January 1998.

Caterpillar Performance Handbook, 27th ed, Caterpillar Inc., Peoria, Illinois, 1996.

Caterpillar Performance Handbook, 28th ed, Caterpillar Inc., Peoria, Illinois, 1997.

## SECTION II: RELATED PUBLICATIONS (Continued)

Caterpillar Performance Handbook, 29th ed, Caterpillar Inc., Peoria, Illinois, 1998.

Earthmoving Principles, International Harvester, Pay Line Division, Schaumburg, Illinois, 1975.

Euclid Hauler Handbook, 14th ed, Euclid, Inc., Cleveland, Ohio, 1981.

Fundamentals of Earthmoving, Caterpillar Tractor Company, Peoria, Illinois, 1975.

Green Guide for Off-Highway Trucks and Trailers, Dataquest, Inc., San Jose, California, 1999.

Green Guide Volume I, Dataquest, Inc., San Jose, California, 1997.

Green Guide Volume II, Dataquest, Inc., San Jose, California, 1999.

Handbook of Heavy Construction, Have, J. A., and F. W. Stubbs Jr., 2nd ed, McGraw-Hill Company, New York, 1971.

Means 1999 Labor Rates for the Construction Industry, 26th ed., R. S. Means Company, Inc., Kingston, Massachusetts.

Moving the Earth, Nichols, H. L., Jr., 3rd ed, North Castle Books, Greenwich, Connecticut, 1976.

Operating Cost Guide, Power Crane and shovel Association, Milwaukee, Wisconsin, 1976.

Owning and Operating Costs, Fiat-Allis Construction Machinery, Inc., Springfield, Illinois, 1983.

Production and Cost Estimating of Material Movement with Earthmoving Equipment, Terex Corporation, Hudson, Ohio, 1981.

## SECTION III: EFAR REFERENCE

### EFARS PART 31 CONTRACT COST PRINCIPLE AND PROCEDURES EAC 95-6

#### SUBPART 31.1 -- APPLICABILITY

#### **31.105 Construction and Architect-Engineer Contracts.**

(d)(2)(i)(b) In this case, equipment ownership and operating costs shall be determined using the Construction Equipment Ownership and Operating Expense Schedule published by the U.S. Army Corps of Engineers.

#### **31.105-100 Contract clause.**

The contracting officer shall insert the statement at 52.231-5000 in all solicitations and contracts for construction within the United States that are expected to exceed the small purchase threshold.

#### **EFARS Clause - 52.231-5000 Equipment ownership and operating expense schedule.**

As prescribed in 31.105.100, insert the following clause in all solicitations and contracts for construction that are expected to exceed the small purchase threshold.

#### EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) -EFARS

(a) This clause does not apply to terminations. See 52.249-5000, Basis for settlement of proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region *[insert Roman numeral for the appropriate region of the schedule]*. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified work was performed shall apply.

### **SECTION III: EFAR REFERENCE (Continued)**

otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment or unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

## SECTION IV. GOVERNMENT BOOKSTORES

U.S. Government periodicals are sold by the Office of the Superintendent of Documents. Orders may be placed by mail from the following address:

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Region:	Region I through XII
Volume No.	Volume No. 1 through No. 12

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(614) 469-6956

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(214) 767-0076

DENVER: 1660 Wynkoop Street, Suite 130, Denver, CO 80202  
(303) 844-3964

DETROIT: Suite 160, Federal Building, 477 Michigan Avenue, Detroit, MI 48226  
(313) 226-7816

HOUSTON: Wells Fargo Center, 801 Travis Street, Suite 120, Houston, TX 77002  
(713) 228-1187

JACKSONVILLE: 100 West Bay Street, Suite 100, Jacksonville, FL 32202  
(904) 353-0569

KANSAS CITY: 120 Bannister Mall, 5600 East Bannister Rd., Kansas City, MO 64137  
(816) 765-2256

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PITTSBURGH: Room 118, Federal Building, 1000 Liberty Avenue, Pittsburgh, PA 15222  
(412) 395-5021

PORTLAND: 1305 S.W. First Avenue, Portland, OR 97201  
(503) 221-6217

PUEBLO: Norwest Banks Building, 201 W. 8th Street, Pueblo, CO 81003  
(719) 544-3142

SAN FRANCISCO: Marathon Plaza, Room 141-S, 303 2nd Street, San Francisco, CA 94107 (415) 512-2770

SEATTLE: Room 194, Federal Building, 915 Second Avenue, Seattle, WA 98174  
(206) 553-4270





## 2. EQUIPMENT VALUE

a. List Price + Accessories: (at Year of Manufacture) = \$ \_\_\_\_\_

(1) Discount: ( List Price + Accessories ) x (Discount Code )  
[ 1.c.(3) ]

( \_\_\_\_\_ ) x ( \_\_\_\_\_ ) = -(\$ \_\_\_\_\_ )

(2) Subtotal [ 2.a. ] - [ 2.a.(1) ] S/T = \$ \_\_\_\_\_

(3) Sales or Import Tax: ( Subtotal ) x ( Tax Rate )  
[ 2.a.(2) ] [ APPENDIX B ]

( \_\_\_\_\_ ) x ( \_\_\_\_\_ ) = +\$ \_\_\_\_\_

(4) Total Discounted Price: Subtotal: [2.a.(2)] + [2.a.(3)] S/T = \$ \_\_\_\_\_

b. Freight: ( Shipping Weight ) x ( Freight Rate per CWT )  
[ 1.a.(8) ] [ APPENDIX B ]

( \_\_\_\_\_ CWT ) x ( \_\_\_\_\_ ) = +\$ \_\_\_\_\_

c. TOTAL EQUIPMENT VALUE (TEV):

2. TOTAL: = \$ \_\_\_\_\_

[ (2.a.(4)) + (2.b) ]

(See Chapter 3 for used and overage equipment rate adjustments.)

## 3. DEPRECIATION PERIOD (N)

a. ( LIFE ) / (Working Hours Per Year ( WHPY )) = N  
[ 1.c.(4) ] [ APPENDIX B ]

( \_\_\_\_\_ Hrs ) / ( \_\_\_\_\_ Hrs/Yr ) 3. TOTAL: = \_\_\_\_\_ Yrs(N)

## 4. OWNERSHIP COST

a. Depreciation

(1) Tire Cost Index ( TCI ):

( Tire Index, Yr of Mfg ) / Tire Index, Based on 1a.(3)) = Tire Cost Index ( TCI )  
[ APPENDIX E, EK=100 ] [ APPENDIX E, EK=100 ]

( \_\_\_\_\_ ) / ( \_\_\_\_\_ ) = \_\_\_\_\_ ( TCI )

(2) [ ( TEV ) x [ 1.0 - (SLV) ] - [ ( TCI ) x ( Tire Cost ) ] ] / ( LIFE )  
[ 2.c. ] [ 1.c.(5) ] [ 4.a. (1) ] [ 1.a.(9)(d) ] [ 1.c.(4) ]

[ ( \_\_\_\_\_ ) x [ 1.0 - ( \_\_\_\_\_ ) ] - [ ( \_\_\_\_\_ ) x ( \_\_\_\_\_ ) ] ] / ( \_\_\_\_\_ )  
= \$ \_\_\_\_\_ /Hr

#### 4. OWNERSHIP COST (Continued)

**b. Facilities Capital Cost of Money (FCCM):**

$$(1) \left[ \left( \frac{N}{[3.a.]} - 1.0 \right) \times \left[ \frac{1.0 + (SLV)}{[1.c.5.]} + 2.0 \right] / \left[ 2.0 \times \left( \frac{N}{[3.a.]} \right) \right] = \text{Avg Value Factor (AVF)}$$

$$\frac{[(\text{Yrs}) - 1.0] \times [1.0 + (\text{Yrs})] + 2.0}{2.0 \times (\text{Yrs})} = \text{AVF}$$

$$(2) \left( \frac{\text{TEV}}{[2.c.]} \right) \times \left( \frac{\text{AVF}}{[4.b.(1)]} \right) \times (\text{Adjusted Cost-of-Money}) / \left( \frac{\text{WHPY}}{[\text{APPENDIX B}]} \right)$$

$$\frac{(\text{_____}) \times (\text{_____}) \times (\text{_____})}{(\text{_____} \text{Hrs/Yr})} = \$ \text{_____} / \text{Hr}$$

**c. TOTAL HOURLY OWNERSHIP COST:** **4. TOTAL:** = \$ \_\_\_\_\_ /Hr  
[ 4.a.(2) ] + [ 4.b.(2) ]

## **5. OPERATING COST**

**a. Fuel Cost:**

(1) Equipment:

$$\frac{(\text{Fuel Factor})}{[1.c.(6)]} \times \frac{(\text{Horsepower})}{[1.a.(5)]} \times \frac{(\text{Fuel Cost Per Gallon})}{[\text{APPENDIX B}]}$$

$$(\underline{\hspace{2cm}}) \times (\underline{\hspace{2cm}} \text{ HP}) \times (\underline{\hspace{2cm}}/\text{Gal}) = \$\underline{\hspace{2cm}}/\text{Hr}$$

**(2) Carrier:**

$$\begin{array}{l} \text{( Fuel Factor )} \times \text{( Horsepower )} \times \text{( Fuel Cost Per Gallon )} \\ \text{[ 1.c.(7) ]} \quad \text{[ 1.a.(6) ]} \quad \text{[ APPENDIX B ]} \\ \\ \text{( _____ )} \times \text{( _____ HP )} \times \text{( _____ /Gal )} \quad \quad \quad = \$ \text{ _____ /Hr} \end{array}$$

<p><b>(3) Total Hourly Fuel Cost:</b></p> <p style="margin-left: 40px;"> <math display="block">\frac{[(5.a (1)) + (5.a (2))]}{}</math> </p>	<p style="text-align: right;">Total 5.a.      = \$ <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span> /Hr</p>
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**b. FOG Cost:**

(1) Equipment:

$$\left( \frac{\text{FOG Factor}}{[1.c.(8)]} \right) \times \left( \frac{\text{Equipment Fuel Cost}}{[5.a.(1)]} \right) \times \left( \frac{\text{LAF}}{[\text{APPENDIX B}]} \right)$$

$$\left( \frac{\text{ }}{\text{ }} \right) \times \left( \frac{\text{ }}{\text{Hr}} \right) \times \left( \frac{\text{ }}{\text{ }} \right) = \$ \frac{\text{ }}{\text{Hr}}$$

## 5. OPERATING COST (Continued)

(2) Carrier:

$$\left( \begin{array}{c} \text{FOG Factor} \\ [1.c.(8)] \end{array} \right) \times \left( \begin{array}{c} \text{Carrier Fuel Cost} \\ [5.a.(2)] \end{array} \right) \times \left( \begin{array}{c} \text{LAF} \\ [APPENDIX B] \end{array} \right)$$

$$\left( \underline{\hspace{2cm}} \right) \times \left( \underline{\hspace{2cm}} / \text{Hr} \right) \times \left( \underline{\hspace{2cm}} \right) = \$ \underline{\hspace{2cm}} / \text{Hr}$$

(3) Total Hourly FOG Cost:  
[ (5.b.(1)) + (5.b.(2)) ]

Total 5.b. = \$                      /Hr

c. Alternative Fuel/FOG Cost:

Total 5.c. = \$                      /Hr

(See Chapter 2, paragraph 24.d. for guidance on when to use.)

d. Repair Cost:

(1) Economic Adjustment Factor (EAF) :  
(EK is from [1 c. (1)])

$$\left( \begin{array}{c} \text{Economic Index for Year 1a.(3)} \\ [APPENDIX E] \end{array} \right) / \left( \begin{array}{c} \text{Economic Index for Year 1a.(4)} \\ [APPENDIX E] \end{array} \right)$$

$$\left( \underline{\hspace{2cm}} \right) / \left( \underline{\hspace{2cm}} \right) = \underline{\hspace{2cm}} (\text{EAF})$$

(See TABLE 3-2 for last year of economic life)

(2) Repair Factor (RF):

$$\left( \begin{array}{c} \text{RCF} \\ [1.c.(10)] \end{array} \right) \times \left( \begin{array}{c} \text{EAF} \\ [5.d.(1).] \end{array} \right) \times \left( \begin{array}{c} \text{LAF} \\ [APPENDIX B] \end{array} \right) = \text{Repair Factor (RF)}$$

$$\left( \underline{\hspace{2cm}} \right) \times \left( \underline{\hspace{2cm}} \right) \times \left( \underline{\hspace{2cm}} \right) = \underline{\hspace{2cm}} (\text{RF})$$

(3) Repair Cost

$$\left[ \left( \begin{array}{c} \text{TEV} \\ [2.c.] \end{array} \right) - \left[ \left( \begin{array}{c} \text{TCI} \\ [4.a.(1)] \end{array} \right) \times \left( \begin{array}{c} \text{Tire Cost} \\ [1.a.(9)(d)] \end{array} \right) \right] \right] \times \left( \begin{array}{c} \text{RF} \\ [5.d.(2)] \end{array} \right) / \left( \begin{array}{c} \text{LIFE} \\ [1.c.(4)] \end{array} \right)$$

$$\left[ \left( \underline{\hspace{2cm}} \right) - \left[ \left( \underline{\hspace{2cm}} \right) \times \left( \underline{\hspace{2cm}} \right) \right] \right] \times \left( \underline{\hspace{2cm}} \right) / \left( \underline{\hspace{2cm}} \right)$$

(4) Total Hourly Repair Cost:

Total 5.d. = \$                      /Hr

## 5. OPERATING COST (Continued)

e. Tire Wear Cost: (Use current price levels. See APPENDIX F.)

(1) Front Tires:

$$\frac{[ 1.5 \times ( \text{FT Cost} ) ]}{[ 1.a.(9)(a) ]} \div \frac{[ 1.8 \times ( \text{FT Wear Factor} ) ]}{[ 1.c.(9)(a) ]} \times ( \text{Maximum Tire Life/Hrs} ) [ \text{APPENDIX G} ]$$

$$\frac{[ 1.5 \times ( \text{ } ) ]}{[ 1.8 \times ( \text{ } ) ]} \times ( \text{ } / \text{Hrs} ) = \$ \text{ } / \text{Hr}$$

(2) Drive Tires:

$$\frac{[ 1.5 \times ( \text{DT Cost} ) ]}{[ 1.a.(9)(b) ]} \div \frac{[ 1.8 \times ( \text{DT Wear Factor} ) ]}{[ 1.c.(9)(b) ]} \times ( \text{Maximum Tire Life/Hrs} ) [ \text{APPENDIX G} ]$$

$$\frac{[ 1.5 \times ( \text{ } ) ]}{[ 1.8 \times ( \text{ } ) ]} \times ( \text{ } / \text{Hrs} ) = \$ \text{ } / \text{Hr}$$

(3) Trailing Tires:

$$\frac{[ 1.5 \times ( \text{TT Cost} ) ]}{[ 1.a.(9)(c) ]} \div \frac{[ 1.8 \times ( \text{TT Wear Factor} ) ]}{[ 1.c.(9)(c) ]} \times ( \text{Maximum Tire Life/Hrs} ) [ \text{APPENDIX G} ]$$

$$\frac{[ 1.5 \times ( \text{ } ) ]}{[ 1.8 \times ( \text{ } ) ]} \times ( \text{ } / \text{Hrs} ) = \$ \text{ } / \text{Hr}$$

(4) Total Tire Wear Cost:  
[ Sum 5.e.(1) through 5.e.(3) ]

Total 5.e. = \$                      /Hr

f. Tire Repair Cost:

$$(\text{Total Tire Wear Cost}) [ 5.e.(4) ] \times 0.15 \times ( \text{LAF} ) [ \text{APPENDIX B} ]$$

$$( \text{ } ) \times 0.15 \times ( \text{ } ) \quad \text{Total 5.f.} = \$ \text{ } / \text{Hr}$$

g. **TOTAL HOURLY OPERATING COST:**  
[ Sum 5.a. through 5.f. ]

**5. TOTAL:** = \$                      /Hr

## 6. HOURLY RATES

### a. Total Hourly Rate: *(based on 40 hours per week)*

( Ownership Cost ) + ( Operating Cost )  
[ 4.c. ] [ 5.g ]

( \_\_\_\_\_/Hr ) + ( \_\_\_\_\_/Hr )

= \$ \_\_\_\_\_/Hr

### b. Other Work Shifts Hourly Rate :

*(Refer to Chapter 3, Adjustments to Rates, for methodology.)*

[ ( Depreciation ) + [ ( FCCM ) x ( 40 hrs/wk ) / ( Work Hrs/wk ) ] + (Operating Cost) ]  
[ 4. a. (2) ] [ 4. b. (2) ] ( example: 60 hrs/wk ) [5.g ]

[ ( \_\_\_\_\_/Hr ) + [ ( \_\_\_\_\_/ Hr ) x ( 40 Hrs/wk ) / ( \_\_\_\_\_Hrs/wk ) ] + ( \_\_\_\_\_/Hr ) ]

= \$ \_\_\_\_\_/Hr

### c. Standby Hourly Rate:

[ ( Depreciation ) x 0.50 ] + ( FCCM )  
[ 4.a.(2) ] [ 4.b.(2) ]

[ ( \_\_\_\_\_/Hr ) x 0.50 ] + ( \_\_\_\_\_/Hr )

= \$ \_\_\_\_\_/Hr

**See Chapter 3 if rate adjustments are necessary.**